

Wayne: I have three purposes in writing this, rather than phoning you.

- I need to explain as clearly as possible what happened this evening;
- I need to explain why, in my view, this is a situation somewhere between bad and dreadful;
- I want to urge as clearly as possible, the need for action by NSF, and to suggest a plan forward; and (possibly);

Facts: Today was the third day of the review. Partly as a result of conversations within the Cost Review Panel (CRP) and partly because of your request that Mark Coles convey concerns and questions to the CRP via email to Steve, the CRP decided this morning to focus on project-wide issues. As a result, this morning's session was mainly devoted to a presentation by Tony Beasley. Tony was asked to discuss a variety of project issues, but there was a second theme, driven by the aftermath of ESO's antenna selection. This probing clearly had a strong component focusing on the decision making process in ALMA, and the problem of a strong Board to represent the project's own interests.

Steve announced that the afternoon was going to be devoted to writing by the panel. The breakouts were declared to be Executive sessions, but were left open to the NSF observers. After asking Steve whether the presence of a Board member was considered necessary (of course, it would probably be distracting given the Board issue circulating around), I left the review for the afternoon.

When I returned, I asked Vern whether he had attended the afternoon sessions. He indicated that he had not, but said he had spoken with Mark and Jack, and had asked them the same question. Vern indicated that they had indeed, and that Mark had told him that they "had not been silent." I became quite concerned about this, and immediately sought out Steve Beckwith to ask what had happened.

Steve indicated that Mark had in fact asked numerous questions, largely along lines similar to those raised in his email of the day before, but that they were good questions and that they were basically helpful. I do not know what Jack did, but I assume he also was very vocal.

Steve also told me that there appeared to be a broad consensus that the ALMA Board had not been strong enough in preventing the antenna contract situation. In addition, some CRP members had expressed serious doubts about Catherine's presence on the ALMA Board (Steve had wondered rhetorically whether she had the power to fire herself); however, a number of the ESO-appointed members are apparently resisting a written evaluation to this effect. Nonetheless, the CRP appears to have reached the same conclusion that we discussed Wednesday morning: the ALMA Board *must* assume clearer ownership of the project and somehow become an oversight body that makes hard decisions.

When I discussed these points with Steve, I explained that I was very, very distressed by Mark's heavy participation in the afternoon discussions. You should know that I was extremely blunt in expressing my concerns (though I also emphasized that I did not hold him or the CRP in any responsible for what was an impossible situation created by NSF, with no clear guidelines and no clear authority.) My most significant worries were that some or all of the European CRP members might conclude that the cost review, originally characterized as belonging to the ALMA Board (and about which ESO had expressed reservations concerning NSF's asymmetrically strong representation) had now been appropriated by one or both of the NSF "observers," that these individuals were suddenly seen to be conducting separate reviews of the review (perhaps coordinated, maybe not), or both. I also told Steve that that as far as knew, it was very unusual for NSF staff to actively question reviewers in the middle of a review, and most especially during the period when a review panel meets to develop a consensus position. Most important, I expressed my concern that the behavior of these two observers undermined the position of the ALMA Board in the eyes of a review committee already doubtful about the Board's role in the project.

Ever constructive, Steve told me he understood my concerns. Although he was no doubt perplexed as to how NSF could have allowed these unresolved currents to surface in a review that it had itself organized, he asked whether he could do anything. I had no suggestions. Steve nonetheless indicated that he would try to ascertain from Thijs de Graauw whether any special European sensitivities might have been aroused by the participation by Mark's and Jack's participation in the IPT breakout panels deliberations. As I write this on Saturday night, I have not yet heard what he found.

Interpretations: We all know ALMA is in a critical state. In large part, this has resulted from the convergence of several factors: rebaselining revealed a larger than expected cost to complete even a heavily descoped array, European procurement idiosyncrasies led to an extraordinary reversal of ESO's vendor choice at the very last minute with additional and severe financial consequences to the project, and (as I have found out in the last two days) the summer's earlier problems within the JAO are again threatening to become an internal distraction to the project.

Worse, the JAO members involved in the dispute are in danger of becoming more general symbols of a potential, chauvinistic conflict within the Board. Trust is at abysmally low ebb in the view of several North American (NA) ALMA Board members, and is probably strongly mirrored on the European (EU) side of the Board. The latter stems from a view that NSF alone must be responsible for the risks it assumed in the "you go first" antenna procurement approach, and that it fully knew ESO could end up selecting another vendor. (Indeed, Catherine insists that she stressed this point to Turner in June – and who knows? No one else was there.) In any case, both these perceptions are now coupled with a deep fear that NSF may veto ESO's antenna contract, and Catherine believes that if this occurs, she will be forced to pull ESO out of ALMA – in this she may well be correct. The illness of Piet van der Kruit could not have come at a worse time. And while hindsight is perfect, in retrospect, the ALMA Board should perhaps have recognized in mid 2003 (just after it was established, to be fair) that unless it had tried to create an

antenna selection process that forced a down-select of the prototype designs, there was no way to abolish the risk of a two antenna array. (Whether or not the Board *could* have done this is another question.)

The likely outcome of the current cost review is the conclusion that the project has made extraordinary progress in the past two years, that technical risk is now largely retired, that the rebaselined WBS is reasonably complete, and that while the cost has increased, the projected cost to complete (which of course doesn't yet include the consequences of the ESO antenna decision) is pretty reasonable. The report may also conclude that weak oversight of the project by the ALMA Board is the one remaining area of significant risk to the project – and although this is most starkly illustrated by the ESO antenna decision, that fact is very unlikely to make its appearance in a consensus report.¹

My view is that Mark and Jack have done sent the wrong message at the wrong time: that to NSF, the Board is an irrelevancy, and that the CRP was either ineptly charged or that without the intervention of the observers, would not have reached the correct conclusions. Regardless of how much of this the CRP in general, and the EU members in particular, will see, I cannot say. However, I believe it will be very clearly seen by the ALMA Board members – and possibly by others – who attended this review. I believe that the dispiriting message that NSF does not consider the Board relevant to ALMA is dangerous to NA interests, and likely be viewed as an opportunity to be exploited by ESO. The fact that it stems from administrative incoherence is an embarrassment that Foundation upper management should consider intolerable. Certainly, I have had it.

Where do we go from here?

ALMA is a fantastic scientific concept. It is also an instrument with enormous exposure for NSF: the agency is ~\$150M into the project, in partnerships with Europe, Canada, and Japan, and as a signatory to the ALMA agreement has made the US government (through the C175 process) co-owner of an organizational scheme now being watched closely by the world's science community for suitability as a model of future collaborations.

Cancellation by NSF is therefore probably not the proximate danger to ALMA at this point – the US does not need another ISABEL, ISS, or SSC. Rather, I believe ALMA faces two other dangers: scope starvation (talk to Jean Turner – a 40 antenna ALMA will be a crippled shadow of its original potential, CAA report or the AD's understanding of it notwithstanding), and slow strangulation (possibly through indifference) in the process of developing its managerial culture and organizational identity.

I have been greatly heartened by the assessment of people like Steve Beckwith and Thijs de Graauw that ALMA's management scheme is simply another form of the matrix

¹ This judgment should be tempered by recognizing that *any* project with strong multiple partners *always* incurs enhanced risk. However, as we have discussed, I also believe the Board needs to become stronger, and central aspect of this will be to remove the conflict of interest created by the ESO DG's presence on the ALMA Board.

management that is widely used in other situations. But the ALMA organizational concept still needs to be fully clarified and developed. This is neither surprising – the project is 2 ½ years old – nor, in the long run, unreasonable: we are talking about a set-up that must operate for more than 50 years. Like it or not, ALMA must now create a clear organizational identity and project culture.

But tactically, our horizon is very short. Within 3 weeks, the NA ALMA partnership must deal with the urgent question of the ESO antenna approval. Within the following few months, NSF will have deal with the rebaselining proposal, this cost review, the upcoming delta baseline and its review, and will have to decide whether and how far it is willing to support the resulting project. The challenges associated with this period are going to accelerate, not retard, the emergence an operational project culture – and NSF must lead this process. This will require active engagement and insight, not incoherent institutional dithering. Unfortunately, the Foundation appears to be in the midst of a truly amazing administrative meltdown that is causing the project – and the US government's interests – great harm.

I see at least five items with which we must deal in the near term. These are:

1. Establishing with our partners a position on ESO's antenna contract and deciding how NA will vote at the ALMA Board tow weeks from now. This is a critical requirement.
2. Restore coherence to ALMA at the Board level and continue the development of a results-oriented Board capable of forcefully acting on behalf of the ALMA project's interests. This is a critical requirement.
3. As part of (2), NSF must have a Board representative whom it clearly supports and empowers to make decisions that embody the interests of the US government and the ALMA project. This is a critical requirement.
4. Rationalize agency lines of authority and reporting for ALMA, to insure that there is a consistent view of the project reaching OD and the rest of the Foundation, and restore sanity and efficiency to program management. This is an essential rather than critical requirement, but it must be addressed within the time frame discussed above.
5. Deal with the JAO personnel situation. The annual performance of the ALMA Director, PM and PE must begin in December-January, and the tensions currently held in temporary suspension must be permanently retired. This is the performance review for Tony and Rick, and the first for Massimo since he has had a staff to manage as Director. Managing these reviews will require tact and firmness.

How to get this job done: I must be replaced immediately as the NSF representative on the ALMA Board. I lack support from anyone at the Foundation beyond AST, have too much history with the current NSF staff who are orbiting ALMA, and have been undercut by the AD's private dealings with the ESO DG and as well as by the Foundation's antics

at the present cost review. In addition, given present management's hierarchical biases, the Board representative can probably no longer be a program manager.

The selection of a temporary and permanent replacement (not necessarily the same person) is a vexing problem, but there are some obvious points. In addition to his personal limitations, Turner is a known short-timer. He will not do. You are obviously not a suitable permanent replacement – you have too much else to do in your position – but you could act in a temporary capacity.

My recommendation is that over the longer term, Judy Sunley be seriously considered to represent NSF on the ALMA Board. She is respected by the Board members I have spoken with, has been coming up to speed on project-specific issues, and understands the strategic issues at stake. Whomever NSF chooses, I suggest that the Director of NSF make the appointment.

NSF should also consider whether having the new person Chair the Board is the best strategy. If a temporary replacement is chosen for the Santiago meeting, I would urge that Jim Hesser be asked to act as Chair, rather than pushing the NSFer into that position on short notice.

Concluding remarks: We should meet next week to discuss these issues. I know this will not be easy given the Senior Review and my travel schedule (I have to leave work early on Friday), but this will not wait.